



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/656,984	09/07/2000	Anthony M. Chiu	00-C-016	2247

7590

01/08/2002

Lisa K Jorgenson
STMicroelectronics Inc
1310 Electronics Drive
Carrollton, TX 75006

EXAMINER

SHUKLA, RAVINDRA B

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 01/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/656,984

Applicant(s)

CHIU, ANTHONY M.

Examiner

Ravi B Shukla

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 9-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other: _____

DETAILED ACTION

1. This Office Action is in response to an application filed on 11-13-2000

Election/Restriction

2. Restriction to one of the following inventions is required under 35 U. S. C. 121:

I. Claims 9-20, drawn to a semiconductor device, classified in class 257 subclass 787.

II. Claims 1-8, drawn to a method of manufacturing a semiconductor device, classified in class 438, subclass 106.

The inventions are distinct, each from the other because of the following reasons: Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MEP. § 806.05(f)). In the instant case unpatentability of the group I invention would not necessarily imply unpatentability of the group II invention, since the device of the group I invention could be made by processes materially different from those of the group II invention. For example, the semiconductor device can be manufactured by folding the portions of lead frame before encapsulation and ~~the device~~.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, the fields of search are not coextensive and separate examination would be required, restriction for examination purposes as indicated is proper.

4. Applicant is advised that the reply to this requirement to be complete must include

Art Unit: 2823

an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

5. In a subsequent telephone conversation on 12-11-01, applicant's attorney Mr. Dan Venglarik elected with traverse, claims 1-8, comprising Group II for examination.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(l).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1- 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crane, Jr. et al (USPN. 6,307,258 B1) hereinafter Crane in view of Ichikawa et al (USPN. 6,165,818) hereinafter Ichikawa.

Art Unit: 2823

With respect to claim 1 Crane show a method of providing electrostatic discharge protection (Figs. 1-2 # 100 col. 3 line 62) for an integrated circuit (Figs. 1-2 # 10 col. 3 line 57), comprising:

mounting an integrated circuit die (Figs 1-2 # 100 col. 3 line 62) on a lead frame (Figs. 1-2 # 200 col. 3 line 62); encapsulating (col. 4 lines 36-40) at least part of the integrated circuit die with a plastic or epoxy material (See col. 4 lines 5-8) ; and show folding a portion of the lead frame around sides of the encapsulated integrated circuit die (# 100) but fails to show folding a portion of lead frame over or adjacent to a peripheral upper surface of the plastic or epoxy material as required in the present claim. However, it would have been obvious to one of ordinary skill in the art to show folding a portion of lead frame over or adjacent to a peripheral upper surface of the plastic or epoxy material as required in the present claim, because selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results. In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946).

With respect to claim 2 Crane shows the steps of connecting the portion of the lead frame (Figs. 1 and 2. # 200 col. 3 line 61) around sides of the encapsulated integrated circuit die (Fig. 1 # 100 Col. 3 line 62) and over or adjacent to a peripheral upper surface of the plastic or epoxy material (See col. 4 lines 5-8) but fails to show connection to a ground voltage.

Ichikawa shows a pair of radiating terminals (Figs 1-2 # 2 col. 1 line 64) of the lead frame (Figs. 1-2 # 12 col. 2 line 8) are connected to grounding lines of the circuit board (See col. 1 lines 59-65).

Art Unit: 2823

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to show the method of Ichikawa in the process of Crane for connecting some terminals of the lead frame to a ground voltage because in doing so various signals can be inputted to and outputted from the pallet and extra heat is radiated from ground terminals. (See Ichikawa col. 1 lines 66-67 and col. 2 lines 1-2).

With respect to claim 3 Crane show the steps of encapsulating at least part of the integrated circuit die (#100) with a plastic or epoxy material further comprising: after mounting the integrated circuit die (#100) on the lead frame (# 200), encapsulating exposed surfaces of the integrated circuit die except for a sensing surface (See Crane col. 4 lines 25-27); and encapsulating wire bonds (Crane Col. 4 lines 12) connecting the integrated circuit die (#100) through leads (#300) to portions of the lead frame (# 200). (See Crane Figs. 1-2 col. 4 lines 11-18 and col. 4 lines 25-30)

With respect to claim 4 Crane in view of Ichikawa show the steps of folding a portion (Ichikawa outer portions Fig. 3 # 5 and # 6 of terminals # 2 and # 3 col. 1 line 56) of the lead frame (Ichikawa Fig. 3 #11 col. 2 line 7) around sides of the encapsulated integrated circuit die (Ichikawa Fig. 1 # 4 Col. 1 line 52) and over or adjacent to a peripheral upper surface of the plastic or epoxy material (# 4). (See Ichikawa col. 1 lines 50-58), folding portions (Ichikawa Fig. 4 # 32 , # 33 col. 6 line 58) of the lead frame (Ichikawa Fig. 4 #41 col. 6 line 47) around each side (Fig. 4 col. 6 lines 52-54) of the encapsulated integrated circuit die (Ichikawa Fig. 4 # 31 col. 6 line 48). (See Ichikawa Figs. 1-2 and Figs. 3-7).

Art Unit: 2823

With respect to claim 5 Crane in view of Ichikawa show the steps of folding a portion (Ichikawa outer portions Fig. 3 # 5 and # 6 of terminals # 2 and # 3 col. 1 line 56) of the lead frame (Ichikawa Fig. 3 # 11 col. 2 line 7) around sides of the encapsulated integrated circuit die (Ichikawa Fig. 1 # 4 Col. 1 line 52) and over or adjacent to a peripheral upper surface of the plastic or epoxy material (# 4), and Ichikawa further teach steps of folding portions (Ichikawa Fig. 4 # 32, # 33 col. 6 line 58) of the lead frame (Ichikawa Fig. 4 # 41 col. 6 line 47) around each side (Fig. 4 col. 6 lines 52-54) of the encapsulated integrated circuit die (Ichikawa Fig. 4 # 31 col. 6 line 48). (See Ichikawa Figs. 1-2 and Figs. 3-7).

folding a first portion (Ichikawa Figs 4- 6 # 47 of terminal #33 and 48 of terminal #32 col. 6 lines 52-65) of the lead frame (Figs. 5 and 6 # 41) around a first side of the encapsulated integrated circuit die (Figs. 5 and 6 # 31 col. 7 line 40), wherein the first portion includes an opening (# 37 col. 7 line 43) providing access for a connector (# 44 col. 7 line 47) to pins (Fig. 5 # 45 col. 7 line 48) electrically connected to the integrated circuit die (Figs. 5 and 6 # 31 col. 7 lines 21-26).

folding a first portion (Ichikawa Figs 5 and 6 # 35 and # 36 col. 7 line 41 of terminal #32 and #33 col. 7 lines 42-43) of the lead frame (Figs. 5 and 6 # 41) around a first side of the encapsulated integrated circuit die (Figs. 5 and 6 # 31 col. 7 line 40), wherein the first portion includes an opening (# 37 col. 7 line 43) providing access for a connector (# 44 col. 7 line 47) to pins (Fig. 5 # 45 col. 7 line 48) electrically connected to the integrated circuit die (Figs. 5 and 6 # 31 col. 7 line 39).

With respect to claim 6 Crane in view of Ichikawa show the steps of folding a portion (Ichikawa outer portions Fig. 3 # 5 and # 6 of terminals # 2 and # 3 col. 1 line 56) of the lead frame (Ichikawa Fig. 3 # 11 col. 2 line 7) around sides of the encapsulated integrated circuit die (Ichikawa Fig. 1 # 4 Col. 1 line 52) and over or adjacent to a peripheral upper surface of the plastic or epoxy material (# 4), and Ichikawa further teach steps of folding portions (Ichikawa Fig. 4 # 32 , # 33 col. 6 line 58) of the lead frame (Ichikawa Fig. 4 # 41 col. 6 line 47) around each side (Fig. 4 col. 6 lines 52-54) of the encapsulated integrated circuit die (Ichikawa Fig. 4 # 31 col. 6 line 48). (See Ichikawa Figs. 1-2 and Figs. 3-7).

folding a portion (Ichikawa Figs 4- 6 terminals #35 #36 col. 7 lines 40-45) of the lead frame (Figs. 5 and 6 # 41) around edges of the encapsulated integrated circuit die (Figs. 5 and 6 # 31 col. 7 line 40), not including leads (# 32 and # 33) electrically connected to the integrated circuit die (#31).

With respect to claim 7 Crane in view of Ichikawa show the steps of folding a portion (Ichikawa outer portions Fig. 3 # 5 and # 6 of terminals # 2 and # 3 col. 1 line 56) of the lead frame (Ichikawa Fig. 3 # 11 col. 2 line 7) around sides of the encapsulated integrated circuit die (Ichikawa Fig. 1 # 4 Col. 1 line 52) and over or adjacent to a peripheral upper surface of the plastic or epoxy material (# 4), and Ichikawa further teach steps of folding portions (Ichikawa Fig. 4 # 32 , # 33 col. 6 line 58) of the lead frame (Ichikawa Fig. 4 # 41 col. 6 line 47) around each side (Fig. 4 col. 6 lines 52-54) of the encapsulated integrated circuit die (Ichikawa Fig. 4 # 31 col. 6 line 48). (See Ichikawa Figs. 1-2 and Figs. 3-7).

Art Unit: 2823

folding a first portion (Ichikawa Figs 4- 6 # 47 of terminal #33 and 48 of terminal #32 col. 6 lines 52-65) of the lead frame (Figs. 5 and 6 # 41) around a side of the encapsulated integrated circuit die (Figs. 5 and 6 # 31 col. 7 line 40); and folding a second portion (#35 and #36 of terminal #32) of the lead frame (#41) extending from the first portion over a peripheral upper surface of the encapsulated integrated circuit die (# 31). (See col. 7 lines 41-45).

With respect to claim 8 Crane in view of Ichikawa show the steps of folding a portion (Ichikawa outer portions Fig. 3 # 5 and # 6 of terminals # 2 and # 3 col. 1 line 56) of the lead frame (Ichikawa Fig. 3 # 11 col. 2 line 7) around sides of the encapsulated integrated circuit die (Ichikawa Fig. 1 # 4 Col. 1 line 52) and over or adjacent to a peripheral upper surface of the plastic or epoxy material (# 4), and Ichikawa further teach steps of folding portions (Ichikawa Fig. 4 # 32 , # 33 col. 6 line 58) of the lead frame (Ichikawa Fig. 4 # 41 col. 6 line 47) around each side (Fig. 4 col. 6 lines 52-54) of the encapsulated integrated circuit die (Ichikawa Fig. 4 # 31 col. 6 line 48). (See Ichikawa Figs. 1-2 and Figs. 3-7).

folding a first portion (Ichikawa Figs 4- 6 # 47 of terminal #33 and 48 of terminal #32 col. 6 lines 52-65) of the lead frame (Figs. 5 and 6 # 41) around a side of the encapsulated integrated circuit die (Figs. 5 and 6 # 31 col. 7 line 40); and folding a second portion (#35 and #36 of terminal #32) of the lead frame (#41) extending from the first portion adjacent to and level with a peripheral upper surface of the encapsulated integrated circuit die (# 31). (See col. 6 lines 66-67 and col. 7 lines 1-4).

Conclusion

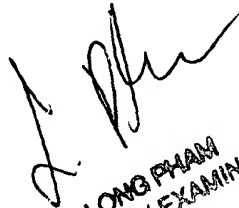
9. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Ravi B. Shukla whose telephone number is (703) -306-0210. The examiner can normally be reached on M-F (8.00-5.00).

10. If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached at (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722

11. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956

rhs

Dec. 20, 2001


LONG PHAM
PRIMARY EXAMINER